Galaxies and black holes grow together

Sydney meeting hears latest from Sloan Digital Sky Survey.
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TOM CLARKE

The bulk of galaxy and black hole growth probably occurred around 10 billion years ago.
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Galaxies and their central black holes grow at the same rate, astronomers have found. The discovery lays to rest the long-standing debate about which came first.

"Like the chicken and the egg, neither black hole nor galaxy can be said to come first," says team member Tim Heckman of Johns Hopkins University in Baltimore, Maryland. His group presented its results at this week's International Astronomical Union meeting in Sydney, Australia.

Most galaxies harbour at their heart a black hole - a pocket of space so dense that it weighs millions of times more than our Sun but is only a few times as big. Black holes' gravity is such that they act like an enormous plughole, sucking in swirls of dust that add to their mass.

Astronomers have long wondered whether black holes gave rise to galaxies by pulling together dust and gas into stars, or whether galaxies - through corralling stars - harnessed enough mass to seed black holes.

Heckman and other members of the Sloan Digital Sky Survey - an international collaboration to map 100 million celestial objects and their properties - studied 120,000 nearby galaxies. They saw the light signatures of the birth of stars and the destruction of matter as it is sucked into a

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black hole.

They conclude that stars form at the same speed as black holes grow. "This is big stuff," says black-hole researcher Andrew King at the University of Leicester, UK. "People will be using this data for many years to come."

The new data hints that we must have been a very active galaxy in the past

Andrew King
University of Leicester

The bulk of galaxy and black-hole growth probably occurred around ten billion years ago. The massive survey was needed to find the few remaining galaxies that are still going through their growth spurt. "These nearby galaxies are a good laboratory for what was happening in the past," Heckman explains.

Our galaxy is smaller than those in the Sloan Digital Sky Survey and has a fairly modest black hole at its core. But the new data suggest that the pair shared growing pains billions of years ago. "It hints that we must have been a very active galaxy in the past," says King.

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